WHAT IS CLAIMED IS:

1. ~~A method of treating a hydrocarbon~~ containing formation in situ, comprising:

providing heat from one or more heat sources to at least one portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation;

controlling the heat from the one or more heat sources such that an average temperature within at least a majority of the selected section of the formation is less than about 375 °C; and

producing a mixture from the formation.

2. The method of claim 1, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

3. The method of claim 1, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

4. The method of claim 1, wherein the one or more heat sources comprise electrical heaters.

5. The method of claim 1, wherein the one or more heat sources comprise surface burners.

6. The method of claim 1, wherein the one or more heat sources comprise flameless distributed combustors.

7. The method ~~of claim~~ 1, wherein the one or more heat sources comprise natural distributed combustors.

8. The method of claim 1, further comprising controlling a pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

9. The method of claim 1, further comprising controlling a pressure within at least a majority of the selected section of the formation with a valve coupled to at least one of the one or more heat sources.

10. The method of claim 1, further comprising controlling a pressure within at least a majority of the selected section of the formation with a valve coupled to a production well located in the formation.

11. The method of claim 1, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

12. The method of claim 1, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity(C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

13. The method of claim 1, wherein allowing the heat to transfer from the one or more heat sources to the selected section comprises transferring heat substantially by conduction.

14. The method of claim 1, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

15. The method of claim 1, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

16. The method of claim 1, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

17. The method of claim 1, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

18. The method of claim 1, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the non-condensable hydrocarbons are olefins.

19. The method of claim 1, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

20. The method of claim 1, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

21. The method of claim 1, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

22. The method of claim 1, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

23. The method of claim 1, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

24. The method of claim 1, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

25. The method of claim 1, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

26. The method of claim 1, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

27. The method of claim 1, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, and wherein the hydrogen is greater than about 10 % by volume of the non-condensable component and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

28. The method of claim 1, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

29. The method of claim 1, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

30. The method of claim 1, further comprising controlling a pressure within at least a majority of the selected section of the formation, wherein the controlled pressure is at least about 2.0 bar absolute.

31. The method of claim 1, further comprising controlling formation conditions such that the produced mixture comprises a partial pressure of H_2 within the mixture greater than about 0.5 bar.

32. The method of claim 31, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

33. The method of claim 1, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

34. The method of claim 1, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

35. The method of claim 1, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

36. The method of claim 1, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

37. The method of claim 1, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

38. The method of claim 1, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

39. The method of claim 1, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

40. The method of claim 1, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

41. The method of claim 1, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

42. The method of claim 1, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

43. The method of claim 1, further comprising separating the produced mixture into a gas stream and a liquid stream.

44. The method of claim 1, further comprising separating the produced mixture into a gas stream and a liquid stream and separating the liquid stream into an aqueous stream and a non-aqueous stream.

45. The method of claim 1, wherein the produced mixture comprises H_2S, the method further comprising separating a portion of the H_2S from non-condensable hydrocarbons.

46. The method of claim 1, wherein the produced mixture comprises CO_2, the method further comprising separating a portion of the CO_2 from non-condensable hydrocarbons.

47. The method of claim 1, wherein the mixture is produced from a production well, wherein the heating is controlled such that the mixture can be produced from the formation as a vapor.

48. The method of claim 1, wherein the mixture is produced from a production well, the method further comprising heating a wellbore of the production well to inhibit condensation of the mixture within the wellbore.

49. The method of claim 1, wherein the mixture is produced from a production well, wherein a wellbore of the production well comprises a heater element configured to heat the formation adjacent to the wellbore, and further comprising heating the formation with the heater element to produce the mixture, wherein the mixture comprises a large non-condensable hydrocarbon gas component and H_2.

50. The method of claim 1, wherein the minimum pyrolysis temperature is about 270 °C.

51. The method of claim 1, further comprising maintaining the pressure within the formation above about 2.0 bar absolute to inhibit production of fluids having carbon numbers above 25.

52. The ~~method of claim 1, further comprising~~ controlling pressure within the formation in a range from about atmospheric pressure to about 100 bar, as measured at a wellhead of a production well, to control an amount of condensable hydrocarbons within the produced mixture, wherein the pressure is reduced to increase production of condensable hydrocarbons, and wherein the pressure is increased to increase production of non-condensable hydrocarbons.

53. The method of claim 1, further comprising controlling pressure within the formation in a range from about atmospheric pressure to about 100 bar, as measured at a wellhead of a production well, to control an API gravity of condensable hydrocarbons within the produced mixture, wherein the pressure is reduced to decrease the API gravity, and wherein the pressure is increased to reduce the API gravity.

54. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from at least the portion to a selected section of the formation substantially by conduction of heat;

pyrolyzing at least some hydrocarbons within the selected section of the formation; and

producing a mixture from the formation.

55. The method of claim 54, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

56. The method of claim 54, wherein the ~~one or more heat sources~~ comprise electrical heaters.

57. The method of claim 54, wherein the one or more heat sources comprise surface burners.

58. The method of claim 54, wherein the one or more heat sources comprise flameless distributed combustors.

59. The method of claim 54, wherein the one or more heat sources comprise natural distributed combustors.

60. The method of claim 54, further comprising controlling a pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

61. The method of claim 54, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1.0 ° C per day during pyrolysis.

62. The method of claim 54, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

63. The method of claim 54, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

64. The method of claim 54, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

65. The method of claim 54, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

66. The method of claim 54, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

67. The method of claim 54, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

68. The method of claim 54, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

69. The method of claim 54, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

70. The method of claim 54, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

71. The method of claim 54, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

72. The method of claim 54, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

73. The method of claim 54, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

74. The method of claim 54, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

75. The method of claim 54, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

76. The method of claim 54, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

77. The method of claim 54, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

78. The method of claim 54, further comprising controlling a pressure within at least a majority of the selected section of the formation, wherein the controlled pressure is at least about 2.0 bar absolute.

79. The method of claim 54, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

80. The method of claim 79, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

81. The method of claim 54, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

82. The method of claim 54, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

83. The method of claim 54, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

84. The method of claim 54, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

85. The method of claim 54, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

86. The method of claim 54, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

87. The method of claim 54, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

88. The method of claim 54, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

89. The method of claim 54, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

90. The method of claim 54, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

91. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation; and

heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

92. The method of claim 91, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

93. The method of claim 91, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

94. The method of claim 91, wherein the one or more heat sources comprise electrical heaters.

95. The method of claim 91, wherein the one or more heat sources comprise surface burners.

96. The method of claim 91, wherein the one or more heat sources comprise flameless distributed combustors.

97. The method of claim 91, wherein the one or more heat sources comprise natural distributed combustors.

98. The method of claim 91, further comprising controlling a pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

99. The method of claim 91, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

100. The method of claim 91, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

107. The method of claim 91, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

108. The method of claim 91, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

109. The method of claim 91, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

110. The method of claim 91, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

111. The method of claim 91, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

112. The method of claim 91, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

113. The method of claim 91, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

wherein heating energy/day provided to the volume is equal to or less than *Pwr*, wherein *Pwr* is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein *Pwr* is the heating energy/day, *h* is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

101. The method of claim 91, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

102. The method of claim 91, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

103. The method of claim 91, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

104. The method of claim 91, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

105. The method of claim 91, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

106. The method of claim 91, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

114. The method of claim 91, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

115. The method of claim 91, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

116. The method of claim 91, further comprising controlling a pressure within at least a majority of the selected section of the formation, wherein the controlled pressure is at least about 2.0 bar absolute.

117. The method of claim 91, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

118. The method of claim 117, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

119. The method of claim 91, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

120. The method of claim 91, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

121. The method of claim 91, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

122. The method of claim 91, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

123. The method of claim 91, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

124. The method of claim 91, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

125. The method of claim 91, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

126. The method of claim 91, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

127. The method of claim 91, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

128. The method of claim 91, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

129. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation;

controlling the heat from the one or more heat sources such that an average temperature within at least a majority of the selected section of the formation is less than about 370 °C such that production of a substantial amount of hydrocarbons having carbon numbers greater than 25 is inhibited;

controlling a pressure within at least a majority of the selected section of the formation, wherein the controlled pressure is at least 2.0 bar; and

producing a mixture from the formation, wherein about 0.1 % by weight of the produced mixture to about 15 % by weight of the produced mixture are olefins, and wherein an average carbon number of the produced mixture ranges from 1-25.

130. The method of claim 129, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

131. The method of claim 129, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

132. The method of claim 129, wherein the one or more heat sources comprise electrical heaters.

133. The method of claim 129, wherein the one or more heat sources comprise surface burners.

134. The method of claim 129, wherein the one or more heat sources comprise flameless distributed combustors.

135. The method of claim 129, wherein the one or more heat sources comprise natural distributed combustors.

136. The method of claim 129, further comprising controlling a pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

137. The method of claim 129, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

138. The method of claim 129, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

139. The method of claim 129, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

140. The method of claim 129, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

141. The method of claim 129, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

142. The method of claim 129, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

143. The method of claim 129, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

144. The method of claim 129, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

145. The method of claim 129, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

146. The method of claim 129, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

147. The method of claim 129, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

148. The method of claim 129, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

149. The method of claim 129, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

150. The method of claim 129, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

151. The method of claim 129, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

152. The method of claim 129, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

153. The method of claim 129, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

154. The method of claim 129, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

155. The method of claim 154, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

156. The method of claim 129, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

157. The method of claim 129, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

158. The method of claim 129, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

159. The method of claim 129, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

160. The method of claim 129, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

161. The method of claim 129, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

162. The method of claim 129, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

163. The method of claim 129, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat

sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

164. The method of claim 129, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

165. The method of claim 129, further comprising separating the produced mixture into a gas stream and a liquid stream.

166. The method of claim 129, further comprising separating the produced mixture into a gas stream and a liquid stream and separating the liquid stream into an aqueous stream and a non-aqueous stream.

167. The method of claim 129, wherein the produced mixture comprises H_2S, the method further comprising separating a portion of the H_2S from non-condensable hydrocarbons.

168. The method of claim 129, wherein the produced mixture comprises CO_2, the method further comprising separating a portion of the CO_2 from non-condensable hydrocarbons.

169. The method of claim 129, wherein the mixture is produced from a production well, wherein the heating is controlled such that the mixture can be produced from the formation as a vapor.

170. The method of claim 129, wherein the mixture is produced from a production well, the method further comprising heating a wellbore of the production well to inhibit condensation of the mixture within the wellbore.

171. The method of claim 129, wherein the mixture is produced from a production well, wherein a wellbore of the production well comprises a heater element configured to heat the formation adjacent to the wellbore, and further comprising heating the formation with the heater element to produce the mixture, wherein the produced mixture comprise a large non-condensable hydrocarbon gas component and H_2.

172. The method of claim 129, wherein the minimum pyrolysis temperature is about 270 °C.

173. The method of claim 129, further comprising maintaining the pressure within the formation above about 2.0 bar absolute to inhibit production of fluids having carbon numbers above 25.

174. The method of claim 129, further comprising controlling pressure within the formation in a range from about atmospheric pressure to about 100 bar absolute, as measured at a wellhead of a production well, to control an amount of condensable fluids within the produced mixture, wherein the pressure is reduced to increase production of condensable fluids, and wherein the pressure is increased to increase production of non-condensable fluids.

175. The method of claim 129, further comprising controlling pressure within the formation in a range from about atmospheric pressure to about 100 bar absolute, as measured at a wellhead of a production well, to control an API gravity of condensable fluids within the produced mixture, wherein the pressure is reduced to decrease the API gravity, and wherein the pressure is increased to reduce the API gravity.

176. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation;

controlling a pressure within at least a majority of the selected section of the formation, wherein the controlled pressure is at least about 2.0 bar absolute; and

producing a mixture from the formation.

177. The method of claim 176, wherein controlling the pressure comprises controlling the pressure with a valve coupled to at least one of the one or more heat sources.

178. The method of claim 176, wherein controlling the pressure comprises controlling the pressure with a valve coupled to a production well located in the formation.

179. The method of claim 176, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

180. The method of claim 176, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

181. The method of claim 176, wherein the one or more heat sources comprise electrical heaters.

182. The method of claim 176, wherein the one or more heat sources comprise surface burners.

183. The method of claim 176, wherein the one or more heat sources comprise flameless distributed combustors.

184. The method of claim 176, wherein the one or more heat sources comprise natural distributed combustors.

185. The method of claim 176, further comprising controlling a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

186. The method of claim 176, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

187. The method of claim 176, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

188. The method of claim 176, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

189. The method of claim 176, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

190. The method of claim 176, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

191. The method of claim 176, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

192. The method of claim 176, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

193. The method of claim 176, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

194. The method of claim 176, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

195. The method of claim 176, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

196. The method of claim 176, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

197. The method of claim 176, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

198. The method of claim 176, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

199. The method of claim 176, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

200. The method of claim 176, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

201. The method of claim 176, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

202. The method of claim 176, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

203. The method of claim 176, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

204. The method of claim 176, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

205. The method of claim 204, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

206. The method of claim 176, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

207. The method of claim 176, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

208. The method of claim 176, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

209. The method of claim 176, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

210. The method of claim 176, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

211. The method of claim 176, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

212. The method of claim 176, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

213. The method of claim 176, wherein producing the mixture from the formation comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

214. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation; and

controlling a pressure within at least a majority of the selected section of the formation, wherein the controlled pressure is at least about 2.0 bar absolute;

controlling the heat from the one or more heat sources such that an average temperature within at least a majority of the selected section of the formation is less than about 375 °C; and

producing a mixture from the formation.

215. The method of claim 214, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

216. The method of claim 214, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

217. The method of claim 214, wherein the one or more heat sources comprise electrical heaters.

218. The method of claim 214, wherein the one or more heat sources comprise surface burners.

219. The method of claim 214, wherein the one or more heat sources comprise flameless distributed combustors.

220. The method of claim 214, wherein the one or more heat sources comprise natural distributed combustors.

221. The method of claim 214, further comprising controlling a pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

222. The method of claim 214, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

223. The method of claim 214, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

224. The method of claim 214, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

225. The method of claim 214, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

226. The method of claim 214, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

227. The method of claim 214, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

228. The method of claim 214, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the non-condensable hydrocarbons are olefins.

229. The method of claim 214, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

230. The method of claim 214, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

231. The method of claim 214, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

232. The method of claim 214, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

233. The method of claim 214, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable

hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

234. The method of claim 214, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

235. The method of claim 214, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

236. The method of claim 214, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

237. The method of claim 214, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

238. The method of claim 214, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

239. The method of claim 214, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

240. The method of claim 214, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

241. The method of claim 214, wherein controlling the heat further comprises controlling the heat such that coke production is inhibited.

242. The method of claim 214, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

243. The method of claim 242, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

244. The method of claim 214, further comprising altering the pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

245. The method of claim 214, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

246. The method of claim 214, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

247. The method of claim 214, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

248. The method of claim 214, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

249. The method of claim 214, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

250. The method of claim 214, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

251. The method of claim 214, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

252. The method of claim 214, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

253. The method of claim 214, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

254. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation;

producing a mixture from the formation, wherein at least a portion of the mixture is produced during the pyrolysis and the mixture moves through the formation in a vapor phase; and

maintaining a pressure within at least a majority of the selected section above about 2.0 bar absolute.

255. The method of claim 254, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

256. The method of claim 254, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

257. The method of claim 254, wherein the one or more heat sources comprise electrical heaters.

258. The method of claim 254, wherein the one or more heat sources comprise surface burners.

259. The method of claim 254, wherein the one or more heat sources comprise flameless distributed combustors.

260. The method of claim 254, wherein the one or more heat sources comprise natural distributed combustors.

261. The method of claim 254, further comprising controlling the pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

262. The method of claim 254, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

263. The method of claim 254, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

264. The method of claim 254, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

265. The method of claim 254, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

266. The method of claim 254, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

267. The method of claim 254, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

268. The method of claim 254, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the non-condensable hydrocarbons are olefins.

269. The method of claim 254, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

270. The method of claim 254, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

271. The method of claim 254, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

272. The method of claim 254, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

273. The method of claim 254, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

274. The method of claim 254, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

275. The method of claim 254, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

276. The method of claim 254, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

277. The method of claim 254, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

278. The method of claim 254, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

279. The method of claim 254, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

280. The method of claim 254, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

281. The method of claim 254, wherein the pressure is measured at a wellhead of a production well.

282. The method of claim 254, wherein the pressure is measured at a location within a wellbore of the production well.

283. The method of claim 254, wherein the pressure is maintained below about 100 bar absolute.

284. The method of claim 254, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

285. The method of claim 284, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

286. The method of claim 254, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

287. The method of claim 254, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

288. The method of claim 254, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

289. The method of claim 254, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

290. The method of claim 254, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

291. The method of claim 254, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

292. The method of claim 254, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

293. The method of claim 254, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

294. The method of claim 254, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

295. The method of claim 254, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

296. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation;

maintaining a pressure within at least a majority of the selected section of the formation above 2.0 bar absolute; and

producing a mixture from the formation, wherein the produced mixture comprises condensable hydrocarbons having an API gravity higher than an API gravity of condensable hydrocarbons in a mixture producible from the formation at the same temperature and at atmospheric pressure.

297. The method of claim 296, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

298. The method of claim 296, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

299. The method of claim 296, wherein the one or more heat sources comprise electrical heaters.

300. The method of claim 296, wherein the one or more heat sources comprise surface burners.

301. The method of claim 296, wherein the one or more heat sources comprise flameless distributed combustors.

302. The method of claim 296, wherein the one or more heat sources comprise natural distributed combustors.

303. The method of claim 296, further comprising controlling the pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

304. The method of claim 296, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

305. The method of claim 296, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

306. The method of claim 296, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

307. The method of claim 296, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

308. The method of claim 296, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

309. The method of claim 296, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

310. The method of claim 296, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the non-condensable hydrocarbons are olefins.

311. The method of claim 296, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

312. The method of claim 296, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

313. The method of claim 296, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

314. The method of claim 296, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

315. The method of claim 296, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

316. The method of claim 296, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

317. The method of claim 296, wherein the produced mixture comprises condensable hydrocarbons, and wherein ~~less than about 5 % by weight of the condensable~~ hydrocarbons comprises multi-ring aromatics with more than two rings.

318. The method of claim 296, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

319. The method of claim 296, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

320. The method of claim 296, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

321. The method of claim 296, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

322. The method of claim 296, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

323. The method of claim 296, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

324. The method of claim 296, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

325. The method of claim 296, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

326. The method of claim 296, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

327. The method of claim 296, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

328. The method of claim 296, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

329. The method of claim 296, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

330. The method of claim 296, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

331. The method of claim 296, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

332. The method of claim 296, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

333. The method of claim 296, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

334. The method of claim 296, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

335. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation;

maintaining a pressure within at least a majority of the selected section of the formation to above 2.0 bar absolute; and

producing a fluid from the formation, wherein condensable hydrocarbons within the fluid comprise an atomic hydrogen to atomic carbon ratio of greater than about 1.75.

336. The method of claim 335, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

337. The method of claim 335, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

338. The method of claim 335, wherein the one or more heat sources comprise electrical heaters.

339. The method of claim 335, wherein the one or more heat sources comprise surface burners.

340. The method of claim 335, wherein the one or more heat sources comprise flameless distributed combustors.

341. The method of claim 335, wherein the one or more heat sources comprise natural distributed combustors.

342. The method of claim 335, further comprising controlling the pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

343. The method of claim 335, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

344. The method of claim 335, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

345. The method of claim 335, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

346. The method of claim 335, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

347. The method of claim 335, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

348. The method of claim 335, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

349. The method of claim 335, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the non-condensable hydrocarbons are olefins.

350. The method of claim 335, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

351. The method of claim 335, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

352. The method of claim 335, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

353. The method of claim 335, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

354. The method of claim 335, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

355. The method of claim 335, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

356. The method of claim 335, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

357. The method of claim 335, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

358. The method of claim 335, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

359. The method of claim 335, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

360. The method of claim 335, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

361. The method of claim 335, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

362. The method of claim 335, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

363. The method of claim 335, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

364. The method of claim 335, further comprising altering the pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

365. The method of claim 335, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

366. The method of claim 335, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

367. The method of claim 335, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

368. The method of claim 335, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

369. The method of claim 335, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

370. The method of claim 335, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

371. The method of claim 335, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

372. The method of claim 335, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

373. The method of claim 335, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

374. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation;

maintaining a pressure within at least a majority of the selected section of the formation to above 2.0 bar absolute; and

producing a mixture from the formation, wherein the produced mixture comprises a higher amount of non-condensable components as compared to non-condensable

components producible from the formation under the same temperature conditions and at atmospheric pressure.

375. The method of claim 374, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

376. The method of claim 374, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

377. The method of claim 374, wherein the one or more heat sources comprise electrical heaters.

378. The method of claim 374, wherein the one or more heat sources comprise surface burners.

379. The method of claim 374, wherein the one or more heat sources comprise flameless distributed combustors.

380. The method of claim 374, wherein the one or more heat sources comprise natural distributed combustors.

381. The method of claim 374, further comprising controlling the pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

382. The method of claim 374, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

383. The method of claim 374, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

384. The method of claim 374, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

385. The method of claim 374, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

386. The method of claim 374, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

387. The method of claim 374, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

388. The method of claim 374, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the non-condensable hydrocarbons are olefins.

389. The method of claim 374, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

390. The method of claim 374, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

391. The method of claim 374, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

392. The method of claim 374, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

393. The method of claim 374, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

394. The method of claim 374, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

395. The method of claim 374, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

396. The method of claim 374, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

397. The method of claim 374, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

398. The method of claim 374, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

399. The method of claim 374, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

400. The method of claim 374, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

401. The method of claim 374, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

402. The method of claim 374, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

403. The method of claim 374, further comprising altering the pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

404. The method of claim 374, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

405. The method of claim 374, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

406. The method of claim 374, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

407. The method of claim 374, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

408. The method of claim 374, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

409. The method of claim 374, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

410. The method of claim 374, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

411. The method of claim 374, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat

sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

412. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation such that superimposed heat from the one or more heat sources pyrolyzes at least about 20 % by weight of hydrocarbons within the selected section of the formation; and

producing a mixture from the formation.

413. The method of claim 412, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

414. The method of claim 412, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

415. The method of claim 412, wherein the one or more heat sources comprise electrical heaters.

416. The method of claim 412, wherein the one or more heat sources comprise surface burners.

417. The method of claim 412, wherein the one or more heat sources comprise flameless distributed combustors.

418. The method of claim 412, wherein the one or more heat sources comprise natural distributed combustors.

419. The method of claim 412, further comprising controlling a pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

420. The method of claim 412, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

421. The method of claim 412, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

422. The method of claim 412, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

423. The method of claim 412, wherein providing heat from the one or more heat sources comprises heating the selected formation such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

424. The method of claim 412, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

425. The method of claim 412, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

426. The method of claim 412, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the non-condensable hydrocarbons are olefins.

427. The method of claim 412, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

428. The method of claim 412, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

429. The method of claim 412, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

430. The method of claim 412, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

431. The method of claim 412, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable

hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

432. The method of claim 412, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

433. The method of claim 412, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

434. The method of claim 412, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

435. The method of claim 412, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

436. The method of claim 412, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

437. The method of claim 412, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

438. The method of claim 412, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

439. The method of claim 412, further comprising controlling a pressure within at least a majority of the selected section of the formation, wherein the controlled pressure is at least about 2.0 bar absolute.

440. The method of claim 412, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

441. The method of claim 412, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

442. The method of claim 412, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

443. The method of claim 412, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

444. The method of claim 412, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

445. The method of claim 412, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

446. The method of claim 412, wherein ~~allowing the heat to transfer comprises~~ increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

447. The method of claim 412, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

448. The method of claim 412, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

449. The method of claim 412, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

450. The method of claim 412, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

451. The method of claim 412, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

452. A method of treating a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the formation;

allowing the heat to transfer from the one or more heat sources to a selected section of the formation such that superimposed heat from the one or more heat sources pyrolyzes at least about 20 % of hydrocarbons within the selected section of the formation; and

producing a mixture from the formation, wherein the mixture comprises a condensable component having an API gravity of at least about 25°.

453. The method of claim 452, wherein the one or more heat sources comprise at least two heat sources, and wherein superposition of heat from at least the two heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation.

454. The method of claim 452, wherein controlling formation conditions comprises maintaining a temperature within the selected section within a pyrolysis temperature range.

455. The method of claim 452, wherein the one or more heat sources comprise electrical heaters.

456. The method of claim 452, wherein the one or more heat sources comprise surface burners.

457. The method of claim 452, wherein the one or more heat sources comprise flameless distributed combustors.

458. The method of claim 452, wherein the one or more heat sources comprise natural distributed combustors.

459. The method of claim 452, further comprising controlling a pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

460. The method of claim 452, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1 °C per day during pyrolysis.

461. The method of claim 452, wherein providing heat from the one or more heat sources to at least the portion of formation comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein Pwr is the heating energy/day, h is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

462. The method of claim 452, wherein allowing the heat to transfer comprises transferring heat substantially by conduction.

463. The method of claim 452, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

464. The method of claim 452, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

465. The method of claim 452, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the non-condensable hydrocarbons are olefins.

466. The method of claim 452, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

467. The method of claim 452, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

468. The method of claim 452, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

469. The method of claim 452, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

470. The method of claim 452, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

471. The method of claim 452, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

472. The method of claim 452, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

473. The method of claim 452, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

474. The method of claim 452, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

475. The method of claim 452, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

476. The method of claim 452, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

477. The method of claim 452, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

478. The method of claim 452, further comprising controlling a pressure within at least a majority of the selected section of the formation, wherein the controlled pressure is at least about 2.0 bar absolute.

479. The method of claim 452, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

480. The method of claim 452, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

481. The method of claim 452, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

482. The method of claim 452, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

483. The method of claim 452, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

484. The method of claim 452, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.

485. The method of claim 452, wherein allowing the heat to transfer comprises increasing a permeability of a majority of the selected section to greater than about 100 millidarcy.

486. The method of claim 452, wherein allowing the heat to transfer comprises substantially uniformly increasing a permeability of a majority of the selected section.

487. The method of claim 452, further comprising controlling the heat to yield greater than about 60 % by weight of condensable hydrocarbons, as measured by the Fischer Assay.

488. The method of claim 452, wherein producing the mixture comprises producing the mixture in a production well, and wherein at least about 7 heat sources are disposed in the formation for each production well.

489. The method of claim 452, further comprising providing heat from three or more heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, and wherein the unit of heat sources comprises a triangular pattern.

~~490. The method of claim 452, further comprising providing heat from three or more~~ heat sources to at least a portion of the formation, wherein three or more of the heat sources are located in the formation in a unit of heat sources, wherein the unit of heat sources comprises a triangular pattern, and wherein a plurality of the units are repeated over an area of the formation to form a repetitive pattern of units.

491. A method of treating a layer of a hydrocarbon containing formation in situ, comprising:

providing heat from one or more heat sources to at least a portion of the layer, wherein the one or more heat sources are positioned proximate an edge of the layer;

allowing the heat to transfer from the one or more heat sources to a selected section of the layer such that superimposed heat from the one or more heat sources pyrolyzes at least some hydrocarbons within the selected section of the formation; and

producing a mixture from the formation.

492. The method of claim 491, wherein the one or more heat sources are laterally spaced from a center of the layer.

493. The method of claim 491, wherein the one or more heat sources are positioned in a staggered line.

494. The method of claim 491, wherein the one or more heat sources positioned proximate the edge of the layer can increase an amount of hydrocarbons produced per unit of energy input to the one or more heat sources.

495. The method of claim 491, ~~wherein the one or more heat sources positioned~~ proximate the edge of the layer can increase the volume of formation undergoing pyrolysis per unit of energy input to the one or more heat sources.

496. The method of claim 491, wherein the one or more heat sources comprise electrical heaters.

497. The method of claim 491, wherein the one or more heat sources comprise surface burners.

498. The method of claim 491, wherein the one or more heat sources comprise flameless distributed combustors.

499. The method of claim 491, wherein the one or more heat sources comprise natural distributed combustors.

500. The method of claim 491, further comprising controlling a pressure and a temperature within at least a majority of the selected section of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

501. The method of claim 491, further comprising controlling the heat such that an average heating rate of the selected section is less than about 1.0 ° C per day during pyrolysis.

502. The method of claim 491, wherein providing heat from the one or more heat sources to at least the portion of the layer comprises:

heating a selected volume (V) of the hydrocarbon containing formation from the one or more heat sources, wherein the formation has an average heat capacity (C_v), and wherein the heating pyrolyzes at least some hydrocarbons within the selected volume of the formation; and

wherein heating energy/day provided to the volume is equal to or less than Pwr, wherein Pwr is calculated by the equation:

$$Pwr = h*V*C_v*\rho_B$$

wherein *Pwr* is the heating energy/day, *h* is an average heating rate of the formation, ρ_B is formation bulk density, and wherein the heating rate is less than about 10 °C/day.

503. The method of claim 491, wherein providing heat from the one or more heat sources comprises heating the selected section such that a thermal conductivity of at least a portion of the selected section is greater than about 0.5 W/(m °C).

504. The method of claim 491, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

505. The method of claim 491, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 0.1 % by weight to about 15 % by weight of the condensable hydrocarbons are olefins.

506. The method of claim 491, wherein the produced mixture comprises non-condensable hydrocarbons, and wherein a molar ratio of ethene to ethane in the non-condensable hydrocarbons ranges from about 0.001 to about 0.15.

507. The method of claim 491, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is nitrogen.

508. The method of claim 491, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is oxygen.

509. The method of claim 491, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 1 % by weight, when calculated on an atomic basis, of the condensable hydrocarbons is sulfur.

510. The method of claim 491, wherein the produced mixture comprises condensable hydrocarbons, wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons comprise oxygen containing compounds, and wherein the oxygen containing compounds comprise phenols.

511. The method of claim 491, wherein the produced mixture comprises condensable hydrocarbons, and wherein greater than about 20 % by weight of the condensable hydrocarbons are aromatic compounds.

512. The method of claim 491, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 5 % by weight of the condensable hydrocarbons comprises multi-ring aromatics with more than two rings.

513. The method of claim 491, wherein the produced mixture comprises condensable hydrocarbons, and wherein less than about 0.3 % by weight of the condensable hydrocarbons are asphaltenes.

514. The method of claim 491, wherein the produced mixture comprises condensable hydrocarbons, and wherein about 5 % by weight to about 30 % by weight of the condensable hydrocarbons are cycloalkanes.

515. The method of claim 491, wherein the produced mixture comprises a non-condensable component, wherein the non-condensable component comprises hydrogen, wherein the hydrogen is greater than about 10 % by volume of the non-condensable component, and wherein the hydrogen is less than about 80 % by volume of the non-condensable component.

516. The method of claim 491, wherein the produced mixture comprises ammonia, and wherein greater than about 0.05 % by weight of the produced mixture is ammonia.

517. The method of claim 491, wherein the produced mixture comprises ammonia, and wherein the ammonia is used to produce fertilizer.

518. The method of claim 491, further comprising controlling a pressure within at least a majority of the selected section of the formation, wherein the controlled pressure is at least about 2.0 bar absolute.

519. The method of claim 491, further comprising controlling formation conditions to produce a mixture of condensable hydrocarbons and H_2, wherein a partial pressure of H_2 within the mixture is greater than about 0.5 bar.

520. The method of claim 519, wherein the partial pressure of H_2 is measured when the mixture is at a production well.

521. The method of claim 491, further comprising altering a pressure within the formation to inhibit production of hydrocarbons from the formation having carbon numbers greater than about 25.

522. The method of claim 491, further comprising controlling formation conditions, wherein controlling formation conditions comprises recirculating a portion of hydrogen from the mixture into the formation.

523. The method of claim 491, further comprising:

providing hydrogen (H_2) to the heated section to hydrogenate hydrocarbons within the section; and

heating a portion of the section with heat from hydrogenation.

524. The method of claim 491, wherein the produced mixture comprises hydrogen and condensable hydrocarbons, the method further comprising hydrogenating a portion of the produced condensable hydrocarbons with at least a portion of the produced hydrogen.